UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/712,827	11/14/2000	Loi Nguyen	93-C-077C1	4608

7590 02/07/2002

Lis K Jorgenson Esq
STMicroelectronics Inc
1310 Electronics Drive
Carrollton, TX 75006-5039

EXAMINER	
PHAM, LONG	
ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 02/07/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/712,827	Applicant(s) NGUYEN ET AL.	
	Examiner Long Pham	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 35-53* is/are pending in the application.

4a) Of the above claim(s) *42-48* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,35-41 and 49-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicant's election with traverse of claims 1, 35-41, and 49-53 in Paper No. 7 is acknowledged. The traversal is on the ground(s) that see the applicant's traverse. This is not found persuasive because that the examiner has only to show the two different dielectric materials can be selectively deposited.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 35, 36, 37, 38, 39, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP5074958 in view of Yamamoto et al.('595).

JP '958 teaches a fabrication method, comprising the steps of (see figures (a)-(c) and the English abstract):

forming dielectric structure over a contact region, the dielectric structure comprising:

a first layer 110 formed from a first material; and

a second layer 111 overlying the first layer and formed from a second material which may be selectively etched with respect to the first material;

forming and patterning a resist layer 112 over the dielectric structure;

selectively etching the second layer through an opening through the patterned resist layer utilizing an etch (isotropic) which is selective of the first material over the second material; and

without stripping the resist layer, etching the dielectric through the opening within the patterned resist layer and any etched region within the second layer to form a contact opening extending through the dielectric structure and exposing the contact region.

With respect to claim 35, JP '958 further teaches forming a third layer 107 underlying the first layer and formed from a material different from the first material.

With respect to claim 36, JP '958 further teaches forming the third layer 107 from a silicate glass doped with a guttering agent, forming the first layer of silicon nitride, and forming the second layer of borophosphosilicate glass.

with respect to claim 37, JP '958 further teaches etching an opening through the second layer.

With respect to claims 38 and 39, JP '958 further teaches utilizing a relatively isotropic or wet etch process to etch the opening through the second layer, wherein the opening through the second layer undercuts the patterned resist layer.

With respect to claim 40, JP '958 further teaches utilizing a relatively anisotropic etch process to etch a reminder of the opening extending through the dielectric structure through the opening within the patterned resist layer. With respect claim 41, JP '958 teaches etching the second layer of silicon nitride through an opening through the patterned resist layer utilizing isotropic etch but fails to teach using plasma etching.

Yamamoto teaches a method of etching in which silicon nitride is etched by plasma etching. See col. 1, lines 15-30.

It would have been obvious to ***one of ordinary skill in the art of making semiconductor devices*** to etch the silicon nitride layer by plasma etching in the method of JP '958 because plasma etching has the advantage of suppressing pollution. See col. 1, lines 15-30.

4. Claims 49, 50, 51, 52, and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP5074958 in view of Yamamoto et al.('595).

JP '958 teaches a fabrication method, comprising the steps of (see figures (a)-(c) and the English abstract):

forming dielectric structure over a contact region, the dielectric structure comprising:

a first layer 110 formed from a first material; and

a second layer 111 overlying the first layer and formed from a second material which may be selectively etched with respect to the first material;

forming and patterning a resist layer 112 over the dielectric structure;

selectively etching the second layer through an opening through the patterned resist layer utilizing a relatively isotropic etch process which is selective of the first material over the second material and which undercuts the patterned resist layer in an etched region formed by the relatively isotropic etch process; and

without stripping the resist layer, etching the dielectric, utilizing a relatively anisotropic etch process, through the opening within the patterned resist layer and the etched region within the second layer to form a contact opening extending through the dielectric structure and exposing the contact region.

With respect to claim 50, JP '958 further teaches etching an opening through the second layer utilizing the first layer as an etch stop.

With respect to claim 51, JP '958 further teaches wet etching the opening through the second layer and the second layer is formed of borophosphosilicate but fails to teach that the etching is done using hydrofluoric acid.

However, the wet etching of insulator using hydrofluoric acid is well-known to ***one of ordinary skill in the art of making semiconductor devices***.

With respect claims 52 and 53, JP '958 teaches etching the second layer of silicon nitride through an opening through the patterned resist layer and the opening through the second layer utilizing isotropic etch and using the patterned resist layer but fails to teach using plasma etching.

Yamamoto teaches a method of etching in which silicon nitride is etched by plasma etching. See col. 1, lines 15-30.

It would have been obvious to ***one of ordinary skill in the art of making semiconductor devices*** to etch the silicon nitride layer by plasma etching in the method of JP '958 because plasma etching has the advantage of suppressing pollution. See col. 1, lines 15-30.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 703-308-1092. The examiner can normally be reached on M-F, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-4082 for regular communications and 703-746-4082 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Long Pham
Primary Examiner
Art Unit 2823

L. P.
February 1, 2002